



5-3-04

1652#

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Date of Mailing: April 30, 2004

DOCKET NO.: M0656.70063US00

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Liu et al.  
Serial No: 09/802,285  
Confirmation. No.: 6877  
Filed: March 8, 2001  
For: HEPARINASE III AND USES THEREOF  
Examiner: Sheridan Swope  
Art Unit: 1652

Commissioner For Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

Transmitted herewith are the following documents:


- ☒ Information Disclosure Statement
- ☒ PTO Form 1449 with cited references
- ☒ Check
- ☒ Return Receipt Postcard

If the enclosed papers are considered incomplete, the Mail Room and/or the Application Branch is respectfully requested to contact the undersigned at (617) 646-8000, Boston, Massachusetts.

A check in the amount of \$180.00 is enclosed. If a further fee is required, the Commissioner is hereby authorized to charge Deposit Account No. 23/2825. A duplicate of this sheet is enclosed.

Respectfully submitted,  
*Liu et al., Applicant*

By:

  
Janice A. Vatland, Reg. No.: 52,318  
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600 Atlantic Avenue  
Boston, Massachusetts 02210-2211  
Telephone: (617) 646-8000

Docket No. M0656.70063US00  
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STATEMENT FILED PURSUANT TO THE DUTY OF  
DISCLOSURE UNDER 37 CFR §§1.56, 1.97 AND 1.98

Sir:

Pursuant to the duty of disclosure under 37 C.F.R. §§1.56, 1.97 and 1.98, the Applicant requests consideration of this Information Disclosure Statement.

PART I: Compliance with 37 C.F.R. §1.97

This Information Disclosure Statement has been filed more than three months after the filing date of this application and after the mailing date of the first Office Action, but before the mailing date of either a final action under 37 C.F.R. §1.113 or a Notice of Allowance under 37 C.F.R. §1.311, or an action that otherwise closes prosecution in this application.

The fee of \$180 as set forth in 37 C.F.R. §1.17(p) is enclosed.

PART II: Information Cited

The Applicant hereby makes of record in the above-identified application the information listed on the attached form PTO-1449 (modified). The order of presentation of the references should not be construed as an indication of the importance of the references.

The Applicant hereby makes the following additional information of record in the above-identified application.

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05/04/2004 SSANDARA 00000006 09802285

01 FC:1806

180.00 OP

The applicant would like to bring to the Examiner's attention the following co-pending applications that may contain subject matter related to this application:

<u>Docket No.</u>	<u>Serial No.</u>	<u>Filing Date</u>	<u>Inventor(s)</u>
M0656.70055WO00	PCT/US00/10990	04/24/2000	Venkataraman et al.
M0656.70076US00	10/108,195	03/27/2002	Kwan et al.
M0656.70086US00	10/291,337	11/08/2002	Liu et al.
M0656.70089US00	10/356,349	01/31/2003	Venkataraman et al.
M0656.70089US01	10/760,133	01/16/2004	Venkataraman et al.
M0656.70089US02	10/759,520	01/16/2004	Venkataraman et al.
M0656.70092US00	10/429,921	05/05/2003	Myette et al.
M0656.70094US00	10/441,970	05/20/2003	Sasisekharan et al.
M0656.70095US00	10/454,816	06/03/2003	Pojasek et al.
M0656.70096US00	10/753,761	01/07/2004	Sasisekharan et al.

The Applicant would like to bring to the Examiner's attention the enclosed search report(s)/communication(s) from corresponding International Application(s).

**Invitation to Pay Additional Fees mailed 02/01/00 for PCT/US99/19841 (M0656.70046WO)**  
**International Search Report mailed 04/27/00 for PCT/US99/19841 (M0656.70046WO)**  
**Written Opinion mailed 06/21/00 for PCT/US99/19841 (M0656.70046WO)**  
**Int'l Preliminary Exam. Report mailed 10/20/00 for PCT/US99/19841 (M0656.70046WO)**  
**Invitation to Pay Additional Fees mailed 10/26/01 for PCT/US01/07464 (M0656.70063WO)**  
**International Search Report mailed 01/22/02 for PCT/US01/07464 (M0656.70063WO)**  
**Written Opinion mailed 02/27/02 for PCT/US01/07464 (M0656.70063WO)**  
**Written Opinion mailed 05/08/02 for PCT/US01/07464 (M0656.70063WO)**  
**Int'l Preliminary Exam. Report mailed 08/05/02 for PCT/US01/07464 (M0656.70063WO)**

The applicant would like to bring to the Examiner's attention the following other information:

**Office Communication mailed 09/14/01 for Application No. 09/384,959 (M0656.70046US00)**  
**Office Communication mailed 06/21/02 for Application No. 09/384,959 (M0656.70046US00)**  
**Office Communication mailed 02/25/03 for Application No. 09/384,959 (M0656.70046US00)**  
**Office Communication mailed 11/17/03 for Application No. 09/384,959 (M0656.70046US00)**  
**Office Communication mailed 03/17/04 for Application No. 09/384,959 (M0656.70046US00)**

PART III: Remarks

Documents cited anywhere in the Information Disclosure Statement are enclosed unless otherwise indicated. It is respectfully requested that:

1. The Examiner consider completely the cited information, along with any other information, in reaching a determination concerning the patentability of the present claims;
2. The enclosed form PTO-1449 be signed by the Examiner to evidence that the cited information has been fully considered by the Patent and Trademark Office during the examination of this application;
3. The citations for the information be printed on any patent which issues from this application.

By submitting this Information Disclosure Statement, the Applicant makes no representation that a search has been performed, of the extent of any search performed, or that more relevant information does not exist.

By submitting this Information Disclosure Statement, the Applicant makes no representation that the information cited in the Statement is, or is considered to be, material to patentability as defined in 37 C.F.R. §1.56(b).

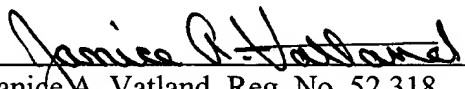
By submitting this Information Disclosure Statement, the Applicant makes no representation that the information cited in the Statement is, or is considered to be, in fact, prior art as defined by 35 U.S.C. §102.

Notwithstanding any statements by the Applicant, the Examiner is urged to form his own conclusion regarding the relevance of the cited information.

An early and favorable action is hereby requested.

Respectfully submitted,  
*Liu et al., Applicant*

By: \_\_\_\_\_

  
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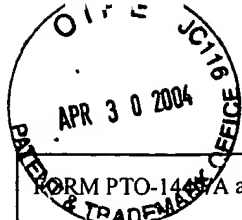
FORM PTO-1462A and B (Modified)  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>				APPLICATION NO.: 09/802,285		ATTY. DOCKET NO.: M0656.70063US00	
				FILING DATE: March 8, 2001		CONFIRMATION NO.: 6877	
				APPLICANT: Liu et al.			
				GROUP ART UNIT: 1652		EXAMINER: Sheridan Swope	
Sheet	1	of	4				

#### U.S. PATENT DOCUMENTS

Examiner's Initials	Cite No.	U.S. Patent Document		Name of Patentee or Applicant of Cited Document	Date of Publication or of issue of Cited Document MM-DD-YYYY
		Number	Kind Code		
	A44	4,551,296		Kavesh et al.	11/05/1985
	A45	4,679,555		Sackner	07/14/1987
	A46	4,830,013		Maxwell	05/16/1989
	A47	4,928,694		Maxwell	05/29/1990
	A48	5,453,171		Ma et al.	09/26/1995
	A49	5,569,366		Chen et al.	10/29/1996
	A50	5,607,859		Biemann et al.	03/04/1997
	A51	5,687,090		Chen et al.	11/11/1997
	A52	5,752,019		Rigoutsos et al.	05/12/1998
	A53	5,759,767		Lakowicz et al.	06/02/1998
	A54	5,767,269		Hirsh et al.	06/16/1998
	A55	5,776,434		Purewal et al.	07/07/1998
	A56	5,855,913		Hanes et al.	01/05/1999
	A57	5,856,928		Yan	01/05/1999
	A58	5,874,064		Edwards et al.	02/23/1999
	A59	5,879,713		Roth et al.	03/09/1999
	A60	5,952,653		Covey et al.	09/14/1999
	A61	5,985,309		Edwards et al.	11/16/1999
	A62	5,990,097		Kennedy	11/23/1999
	A63	5,993,846		Friedman et al.	11/30/1999
	A64	6,116,237		Schultz et al.	09/12/2000
	A65	6,136,295		Edwards et al.	10/24/2000
	A66	6,190,875	B1	Ben-Artzi et al.	02/20/2001
	A67	6,268,146	B1	Schultz et al.	07/31/2001
	A68	6,291,439	B1	Klock	09/18/2001
	A69	6,309,853	B1	Friedman et al.	10/30/2001
	A70	6,333,051	B1	Kabanov et al.	12/25/2001
	A71	6,597,996	B1	Venkataraman et al.	07/22/2003
	A72	RE37,053	E	Hanes et al.	02/13/2001

#### FOREIGN PATENT DOCUMENTS

Examiner's Initials	Cite No.	Foreign Patent Document			Name of Patentee or Applicant of Cited Document (not necessary)	Date of Publication of Cited Document MM-DD-YYYY	Translation (Y/N)
		Office/ Country	Number	Kind Code			
	B18	EP	0 114 589	B1	President and Fellows of Harvard College	09/23/1987	
	B19	EP	0 140 781	A2	DROPIC Societe Civile de Gestion de Droit de Propriete Industrielle CHOAY	05/08/1985	Y (abstract only)



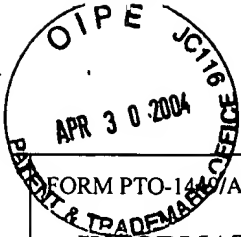
FORM PTO-1467A and B (Modified)  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>				APPLICATION NO.: 09/802,285		ATTY. DOCKET NO.: M0656.70063US00	
				FILING DATE: March 8, 2001		CONFIRMATION NO.: 6877	
				APPLICANT: Liu et al.			
				GROUP ART UNIT: 1652		EXAMINER: Sheridan Swope	
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	B20	EP	0 342 215	B1	Genentech, Inc. and Neorx Corp.	08/25/1993	
	B21	WO	93/10450		Glyko, Inc.	05/27/1993	
	B22	WO	93/15406		Imperial College of Science, Tech & Med	08/05/1993	
	B23	WO	93/19734		Baker Norton Pharmaceuticals	10/14/1993	
	B24	WO	96/32149		Inhale Therapeutics, Inc.	10/17/1996	
	B25	WO	97/06783		Baker Norton Pharmaceuticals	02/27/1997	
	B26	WO	97/35562		Danbiosyst UK Ltd.	10/02/1997	
	B27	WO	98/04902		State of Oregon through the State Board...	02/05/1998	
	B28	WO	98/31346		Massachusetts Institute of Technology	07/23/1998	

# **OTHER ART — NON PATENT LITERATURE DOCUMENTS**

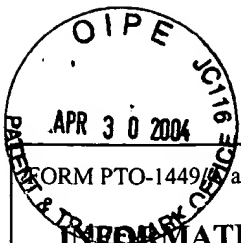
Examiner's Initials	Cite No	Include name of the author (in CAPITAL LETTERS) title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, relevant page(s), volume-issue number(s), publisher, city and/or country where published.	Translation (Y/N)	
	C60	BIEMANN, K., <i>J Am Soc Mass Spectrom</i> , 13(11):1254-1272, 2002		
	C61	CARLSON, T.H. et al., <i>The Journal of Biological Chemistry</i> , 263(5):2187-2194, 1988		
	C62	CLAVERIE et al., <i>Computers Chem</i> , Vol. 17, No 2: pp 191-201 1993		
	C63	CRUM et al., "A new class of steroids inhibits angiogenesis in the presence of heparin or a heparin fragment", <i>Science</i> , 230: 1375-1378, 1985		
	C64	DULL et al., "Lung endothelial heparan sulfates mediate cationic peptide-induced barrier dysfunction: a new role for the glycocalyx", <i>Am. J. Physiol. Lung Cell Mol. Physiol.</i> , 285:L986-995, 2003		
	C65	EDWARDS, D.A. et al., <i>Science Reprint Series</i> 276:1868-1871, 1997	/	
	C66	EDWARDS, D.A. et al., <i>J. Appl. Physiol.</i> , 85(2):379-385, 1998	/	
	C67	ERNST et al., "Expression in <i>Escherichia coli</i> , purification and characterization of heparinase I from <i>Flavobacterium heparinum</i> ", <i>Biochem. J.</i> , 315:589-597, 1996	/	
	C68	FOLKMAN et al., "Angiogenesis inhibition and tumor regression caused by heparin or a heparin fragment in the presence of cortisone", <i>Science</i> , 221:719-725, 1983	/	
	C69	GIOLDASSI, J., <i>Liquid Chromatography and Related Technology</i> , 22(13):1997-2007, 1999	/	
	C70	GODAVARTI et al., "Heparinase I from <i>Flavobacterium heparinum</i> ", <i>The Journal of Biological Chemistry</i> , 273(1):248-255, 1998	/	
	C71	GUERRINI et al., "A novel computational approach to integrate NMR spectroscopy and capillary electrophoresis for structure assignment of heparin and heparan sulfate oligosaccharides", <i>Glycobiology</i> , 12(11):713-719, 2002	/	
	C72	HARENBERG, J., et al., <i>Blood Coagulation and Fibrinolysis</i> , 7:477-482, 1996	/	
	C73	HAYES, B., <i>American Scientist</i> , 86(3):216-221, 1998	/	
	C74	HORNER, A.A., <i>Biochem. J.</i> , 244:693-698, 1987	/	
	C75	JOHNSON et al., "Endothelial cells preparing to die by apoptosis initiate a program of transcriptome and glycome regulation", <i>FASEB Journal</i> , 18:188-190, 2004	/	
	C76	KANABROCKI, E.L. et al., <i>Chronobiology International</i> , 8(3):210-233, 1991		





FORM PTO-146/A and B (Modified)		APPLICATION NO.: 09/802,285	ATTY. DOCKET NO.: M0656.70063US00
INFORMATION DISCLOSURE STATEMENT BY APPLICANT		FILING DATE: March 8, 2001	CONFIRMATION NO.: 6877
		APPLICANT: Liu et al.	
		GROUP ART UNIT: 1652	EXAMINER: Sheridan Swope
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C77	KANABROCKI, E.L. et al., <i>Quarterly Journal of Medicine</i> , 83(300):259-282, 1992	/	
C78	KEISER et al., "Direct isolation and sequencing of specific protein-binding glycosaminoglycans", <i>Nature Medicine</i> , 7(1):123-128, 2001	/	
C79	KISHIBE et al., <i>J. Biol. Chem.</i> , 275(20):15321-15329, 2000	/	
C80	KREITZ, M.R. et al., <i>Biomaterials</i> , 18:1645-1651, 1997	/	
C81	LECKBAND, D., et al., <i>Abstracts of Papers from the Fourth Chemical Congress of North America</i> , 202(1):a56, 1991	/	
C82	LIU, <i>Glycobiology</i> , 5(8): 765-774, 1995	/	
C83	LIU, D, et al., "Tumor cell surface heparan sulfate as cryptic promoters or inhibitors of tumor growth and metastasis", <i>PNAS</i> , 99(2):568-573, 2002	/	
C84	LIU, D. et al., "Dynamic regulation of tumor growth and metastasis by heparan sulfate glycosaminoglycans", <i>Seminars in Thrombosis and Hemostasis</i> , 28(1): 67-78, 2002	/	
C85	LIU, J, et al., "Characterization of a heparan sulfate octasaccharide that binds to herpes simplex virus type 1 glycoprotein D", <i>The Journal of Biological Chemistry</i> , 277(36), 33456-33467, 2002	/	
C86	MARCINIAK, E., <i>Blood</i> , 59(3):576-581, 1982	.	
C87	MCLEAN, M.W., et al. "Enzymic Removal of 2-O-Sulphato- $\Delta_4,5$ -Glycuronic Acid Residues from Heparin Oligosaccharides", <i>Proceeding of the 7<sup>th</sup> International Symposium of Glycoconjugates</i> , pp. 68-69, 1983	/	
C88	MYETTE et al., "Molecular cloning of the heparin/heparan sulfate $\Delta_4,5$ unsaturated glycuronidase from <i>Flavobacterium heparinum</i> , its recombinant expression in <i>Escherichia coli</i> , and biochemical determination of its unique substrate specificity", <i>Biochemistry</i> , 41:7424-7434, 2002	/	
C89	MYETTE et al., "The heparin/heparan sulfate 2-O-sulfatase from <i>Flavobacterium heparinum</i> ", <i>The Journal of Biological Chemistry</i> , 278(14):12157-12166, 2003	.	
C90	MYETTE et al., "Expression in <i>Escherichia coli</i> , purification and kinetic characterization of human heparan sulfate 3-O-sulfotransferase-1", <i>Biochemical and Biophysical Research Communications</i> , 290:1206-1213, 2002	/	
C91	NESHEIM, M. et al., <i>The Journal of Biological Chemistry</i> , 261(7):3214-3221, 1986	/	
C92	PIXLEY, R. et al., <i>Thrombosis Research</i> , 26:129-133, 1982	/	
C93	POJASEK et al., "Biochemical characterization of the chondroitinase B active site", <i>The Journal of Biological Chemistry</i> , 277(34):31179-31186, 2002	/	
C94	RAMAN et al., "Identification of structural motifs and amino acids within the structure of the human heparan sulfate 3-O-sulfotransferase that mediate enzymatic function", <i>Biochemical and Biophysical Research Communications</i> , 290:1214-1219, 2002	/	
C95	RAMAN et al., "The heparin/ heparan sulfate 2-O-sulfatase from <i>Flavobacterium heparinum</i> ", <i>The Journal of Biological Chemistry</i> , 278(14):12167-12174, 2003	/	
C96	RHOMBERG, A.J., <i>Proc. 45<sup>th</sup> Annual Conference on Mass Spectrometry Allied Topics</i> , 1026-1027, 1997 <b>ABSTRACT ONLY</b>	/	
C97	RHOMBERG, A.J., <i>MIT (Department of Chemistry)</i> , 1998 <b>THESIS</b>		
C98	RUDD, P.M., et al., <i>Nature</i> , 388(6638):205-207, 1997	.	
C99	SASISEKHARAN et al., "Roles of heparan-sulphate glycosaminoglycans in cancer", <i>Nature Reviews</i> , 2:521-528, 2002		



<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>		APPLICATION NO.: 09/802,285	ATTY. DOCKET NO.: M0656.70063US00
		FILING DATE: March 8, 2001	CONFIRMATION NO.: 6877
		APPLICANT: Liu et al.	
		GROUP ART UNIT: 1652	EXAMINER: Sheridan Swope
Sheet	4	of	4

	C100	SHRIVER et al., "Emerging views of heparan sulfate glycosaminoglycan structure/activity relationships modulating dynamic biological functions", <i>TCM</i> , 12(2): 71-77, 2002		
	C101	SUNDARAM et al., "Rational design of low-molecular weight heparins with improved <i>in vivo</i> activity", <i>PNAS</i> , 100(2): 651-656, 2003		
	C102	TAYLOR et al., "Protamine is an inhibitor of angiogenesis", <i>Nature</i> , 297:307-312, 1982.		
	C103	YAN, J.F., et al., <i>J. Theor. Biol.</i> , 151:333-341, 1991		
	C104	ZHAO, Y., et al., <i>Proc. Natl. Acad. Sci.</i> , 94:1629-1633, 1997		

EXAMINER	DATE CONSIDERED
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#EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

\*a copy of this reference is not provided as it was previously cited by or submitted to the office in a prior application, Serial No. \_\_, filed \_\_, and relied upon for an earlier filing date under 35 U.S.C. 120 (continuation, continuation-in-part, and divisional applications).

[NOTE - Must provide a copy of any patent, publication, other information listed, even if it was previously submitted to, or cited by, the U.S. Patent Office in an earlier application, unless the earlier application is identified by the IDS and is relied upon for an earlier filing date under 35 U.S.C. §120, and the copy was provided in the earlier application.]